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BOTANICAL SURVEY OF INDIA

Its Past, Present and Future

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Introduction

With such great variations in her geographical features as in the stretches of formidable and lofty Himalayan Ranges, Tablelands and Plateaus, in the mountain systems of the Vindhyas and the Western and Eastern Ghats, the deep valleys of Assam, the highlands of Central India, the great alluvial plains of the North and the lower terrains of South India, the Indian Peninsula exhibits a variety of Flora and Forest types within a confine for which there is perhaps no similar example in any other country in the World. From early historic times, the vegetable resources of India had attracted the attention of the foreign peoples. As we trace the influence the civilisation of the Western peoples had on the East, we find that it had resulted primarily on the demand in the Ancient Egypt for luxuries obtained from vegetable and other sources, which had ultimately established a trade with India and the East. Gradually, as is to be expected, the trade with India on such and other forest produce grew in importance drawing into the scene the Arabs, the Turks, the Portuguese, the Dutch, the French and finally the English. The Portuguese were, perhaps, the first among the European powers in this field in India, who ultimately gave way to the Dutch, till when in 1570, the English entered into the competition. With a view to stabilise trade with India, the British East India Company was formed, the Charter for which being signed by Queen Elizabeth at the close of the year 1599. Subsequently when the English Traders became the Rulers, discrete utilisation and scientific management of forest-wealth of India assumed importance, with the setting up of definite policies. It was in these and similar circumstances that an institution for the survey of the enormous botanical resources of the country was conceived.

Botanical pursuits before and during the Honourable East India Company days

Towards the latter part of the 16th Century, the realisation of the medicinal virtues of herbs promoted the teaching of Medicine in North Italy, with the simultaneous development of "live" and "dry" gardens, the latter consisting of dried and mounted specimens kept in definite sequences, as aids in the systematic classification of plants. Energetic and enthusiastic men of medical profession soon extended similar activities to places outside Italy. Even before the advent of the British on the Indian Soil, and the formation of the Honourable East India Company in 1599, in India also there had been similar botanical pursuits. As early as 1534, Garcia da Orta, a renowned Portuguese physician was commissioned to India, and during his period of service till 1570, he had studied the drug plants, narcotics and other economic species, growing them in his own garden at Goa. He had contributed much to the knowledge of the plant resources of our country in trade, in local use, and to these he had also added several plants which were then new to science. Thus, the earliest attention to the useful plants of India seems to have been paid by the Portuguese and the observations of Garcia da Orta, Christopher da Costa and of Belon formed the basis of the work of Ausius entitled Exoticorum libridacem, Antwerp, 1563. At the time of the Hon'ble East India Company, Van Rheede, who took over the office of the Governor of the Dutch Settlements in the East Indies in Malabar in 1667, devoted himself to the studies and collection of plants from Malabar. It would be of interest to reproduce here the method adopted by Van Rheede, which contributed to his great success in his own mission of collection of plants from different places. By his own initiative and drive, he had caused "that several Indian physicians and Brahmans had composed by his order a catalogue of the most celebrated plants which they distributed according to their times of blossoming and seeding, to the configuration of their leaves and to the forms of their flowers and fruits ; that at proper seasons, he gave copies of the list to several intelligent men, of whom he sent parties into different forests, with instructions to bring him from all quarters such plants as they saw named, with their fruit, flowers and leaves, even though they should be obliged to climb the most lofty trees for them ; that three or four painters, who lived in his family constantly and accurately delineated the forest plants of which in his presence a full description was added . . ." Thus he procured all the new plants, described them and had drawings made of them. By inspiring several medical men, he had also accumulated a vast treasure of dried and mounted specimens from various places in S. India. The monumental work, the *Hortus Malabaricus* (1678-1703) in 12 volumes with 794 plates, which could perhaps claim the distinction of being the first work of recognition and value on the systematics of Indian plants, which Linneaus himself pronounced "accurate" was the result of the untiring energy and drive of Van Rheede. The Hon'ble East India Company, which had its own Physicians and Surgeons engaged in the collection of plants from Madras, for purposes of cultivation of the exotics in the home-land, had resorted to Van Rheede and his collectors for help and their services. The pioneering efforts of Garcia da Orta and Van Rheede may be deemed in a way as the forerunners of Survey of Botanical resources of our country on a planned scientific basis.

Towards the 18th century, the interest in botanical collections in India had become wide-spread. There had been different agencies actively engaged in the exploration of plants from the Southern, Western, Northern and Eastern parts of India, as also from Assam and Burma. Missionaries, men in medical profession, servants of the Hon'ble East India Company and the Governments of Madras, Bombay and Bengal were all enthusiastically probing into the different forest areas, making interesting and huge collections. In many cases such collections even proved to be of outstanding value and significance as material contributions to the knowledge of the "Flora" of our country. Among the principal contributors, mention is to be made of Koenig, Roxburgh, Heyne, Wight, Campbell, Klein, Rottler, Schmid, Thunberg, Belanger, Kirkpatrick, Buchanan, Wallich, Gibson and others. Arrangements also existed then to transfer the collections so made by some of them to Linneaus, Sir Joseph Banks, Hooker and others, and from time to time to the India House, Linnean Society and elsewhere.

Alongside with such botanical enterprises, horticulture had also assumed importance under certain exigencies, and at important centres new Botanic Gardens were organised for the purposes of introduction and cultivation of exotic species. At the suggestion of Robert Kyd, the Hon'ble East India Company's Garden at Sibpur, Calcutta, with 350 acres of land allotted to it, came into existence in 1787. Simultaneously other gardens had come up also at Bombay, Saharanpur, Madras and other centres. Each of the Gardens, however, had its own nucleus of HERBARIUM—a collection of dried plants for reference purposes. There would thus appear to have been a better appreciation of the country's vegetable wealth and flora during the Company's rule in India. By that time, taxonomic Botany had also come to the forefront as an indispensable instrument in the study of Medicine, in the practice of Horticulture and in Forest utilisation and conservation.

It would be of interest to note that the achievements made as related to this period, were mainly due to the initiative and drive of the individuals concerned rather than to any Central authority regulating the policies. The Government set-up in the country at that time was also such as not to lend possibilities for co-ordinated regional activities. However, a real effort to create a Central Survey for a co-ordinated activity for the fuller appreciation of the flora of our country as a whole appears to have been made only after the Government of the country passed from the Hon'ble East India Company to the Crown in 1858.

ORGANISATION AND SET-UP OF THE BOTANICAL SURVEY OF INDIA

By the ultimate quarter of the 19th Century, the Botanical work done by the local Governments of Bengal, Bombay, North-western Provinces and Madras at their respective Botanical departments in the Gardens set up earlier at Sibpur, Poona, Saharanpur and Madras, appears to have come under critical review. It is to be remembered that while the Gardens were being established for the cultivation of exotic plants of interest in commerce and trade, they were intended to be sources of botanical information as well. The achievements in botanical work in the earlier periods were also tremendous, particularly at the Sibpur Gardens under the scientific management of such eminent men as Kyd, Roxburgh, Buchanan, Wallich, Griffith, T. Thomson, and others. That had also resulted in outstanding publications such as the *Flora Indica, Plantae Coromandeliana, Plantae Asiaticae,* etc., under the munificence of the Hon'ble East India Company, and a Herbarium or collection of dried plants, unique and foremost in India and East, for its varied composition and standard, as besides valuable collections from individual contributors in India as those of Vicary, Edgeworth, Griffith, Wight, Gibson, Duetzell, Kurz and others ; it consisted also of considerable contributions from distinguished Botanists and Botanical institutions in Europe and elsewhere such as from the great National collections at Kew, British Museum, London, Jardin des Plantes, Paris, Imperial Gardens at St. Petersberg, Berlin, Buitenzorg and Peradeniya, and with fair representations of plants from S. E. Asia, Japan, Persia, Asia-Minor, Africa and America.

There had been, however, a decline in efficiency and standard in later years, in respect of the botanical work done in the various establishments under the local governments. Thus about 1887, the review of the work done at the Botanical establishment at Bombay in the immediate preceding years revealed that it related chiefly to the sale of seeds of beans, peas, cabbages and others, obtaining them wholesale and selling them retail, which functions can hardly be styled as botanical work. Because of this deterioration in the general policy, it was felt then that for real Botanical work to be done, the garden should be placed under an eminent botanist who, in independent charge of his department, could correspond with his counterparts in Bengal, North-western Provinces, Madras and Kew.

Contemporaneous developments in Saharanpur Gardens also indicated that during the tenure of office of Dr. Jameson, the Botanical part of the work at Saharanpur was utterly lost sight of, here again, the activities being diverted to cultivation of vegetables and other plants for supply to "Soldiers' Gardens". As is to be expected, with such activities, the respective local governments could neither have interest nor pride in their gardens. The lines on which the Botany Department of the Madras Government had to be set up had also simultaneously come up for active consideration of the Governments and the authorities at Kew.

About this time, the Government of India had before them programmes for the explorations in the Frontier and Trans-Frontier regions in N. W. Punjab, Central Provinces, Central India, Rajputana, Assam, Burma and Andamans. The occasion was one most suited to set up a Central organisation for the Botanical work, by pooling the then available resources. The Government of India, therefore, decided that J. F. Duthie, who was then the Superintendent of the Gardens at Saharanpur, be dissociated from the Gardens then under the Provincial Government of North-Western Provinces, to enable him to undertake the explorations in N. W. Provinces. They also decided to take over from the Government of N. W. Provinces, the herbarium existing then at Saharanpur with the building in which the herbarium was housed, and the residence of the Superintendent of the Gardens. The Headquarters of the newly constituted office were decided to be retained at Saharanpur only. These adjustments were found necessary from practical side for the work to be done efficiently, and to facilitate the cost of explorations being made an Imperial charge and the exploring botanist an Imperial servant. These proposals met with the ready approval of the N.W.P. Government. The organisation at the Sibpur Gardens was, however, in a comfortable position to undertake easily the explorations of Assam, Burma and Andamans, and as such no new organisation was created for the purpose.

As co-ordination of the Botanical work of the country through a Central organisation proved a desideratum, proposals were before the Government in this respect, and the scheme for the organisation of a Survey having met with the approval of the Secretary of State for India in July 1887, the Survey was formally constituted on the 13th February 1890 under the designation "BOTANICAL SURVEY OF INDIA". Its functions were broadly laid down as (1) exploring the vegetable resources of the Indian Empire and (2) co-ordinating the Botanical work of others in different parts of India.

The country was divided for the purposes of the Survey into four Botanical regions, viz. the East, North, West and South, with centres at Calcutta (Sibpur), Saharanpur, Bombay (Poona) and Madras respectively, exactly corresponding to the centres where botanical activities had been evident in earlier years. The Calcutta unit was acknowledged as the centre of the Botanical Survey of India. Brigade Surgeon, Lt. Colonel Sir George King, who was then the Superintendent of the Calcutta (Sibpur) Gardens, was made the Central authority in the Botanical Survey. In view of this important position assigned to him, he was allowed the official designation of the Director of the Botanical Survey of India in a purely Honorary capacity. Mr. Duthie, Superintendent of Saharanpur Gardens ; Dr. J. Cook, the Principal of the Science College, Poona and Mr. M. A. Lawson, the Government Botanist to Madras and Director of Government Cinchona Plantations on the Nilgiris, became also the first Directors of the respective surveys under their jurisdiction, under this scheme.

Progress of the Integrated Survey

The integration of the principal centres of the Botanical activities, and the co-ordination of their functions through a Central agency, could normally be expected to have brought about confidence in implementing the policies for the realisation of the objectives. The Botanical Survey, however, appears to have had mixed fortunes, as its history in the years following were not without incidents.

The Survey, however, had no separate staff of its own. Co-ordination only appears to have been attempted initially, each of the existing institutions at Calcutta, Saharanpur, Bombay and Madras being asked to submit reports of its activities to the Government of India through the Director, Botanical Survey of India.

The co-ordination of the activities of the different Surveys attempted does not appear to have worked satisfactorily. The Madras Survey had submitted its report for just three years only after the organisation of the Botanical Survey in 1890. With the death of Lawson, its first Director, no reports were submitted for several years from 1894-95. However, with the appointment of C.A. Barber as Government Botanist to Madras, and his becoming an effective officer of the Botanical Survey from the 25th April 1900, the Survey activities at Madras appear to have been revived. But even this did not last long. As the Government of Madras were not enthusiastic in carrying out the agreement entered by it with the Government of India, and approved by the Secretary of State, in the matter of their willingness to co-operate in the Botanical Survey of South India, the Madras Survey ultimately severed its connection with the Botanical Survey by about 1907 within a decade of Barber's appointment. The separatist tendencies appear to have asserted themselves in other Surveys also when Bombay about the same time severed its connection with the Botanical Survey of India. The two Governments thereupon entrusted their botanical work to their own Economic Botanists—officers specifically created by them later.

The Eastern and Northern Surveys were actively engaged in explorations for some years. But in course of time, there had been an ebb in the enthusiasm for explorations even in respect of these regions. The link with the Saharanpur Survey had also snapped on the retirement of Mr. Duthie on 31.12.1902, when the post held by him was also abolished. The Economic Botanist to the Government of the United Provinces was shown in the classified list of officers of Botanical Survey after Duthie, but this arrangement was also short-lived and ultimately proved non-functional, as after Duthie, practically whatever work was done in respect of this region, that was by persons quite unconnected with the Botanical Survey. By about 1905 even the Herbarium with its establishment reverted back to the provincial Government of U. P. and the charges thereon were also provided in their estimates thenceforth.

The Herbarium at Sibpur Gardens, however, undoubtedly benefited by the arrangements made to set up regional Surveys, as it had received collections from various centres, as also from private collectors. Obviously, the policies and their implementations had failed to evoke enthusiasm and interest in the various local Governments, which perhaps had accelerated the fragmentation of the Surveys well within two decades of their organisation, ultimately leaving the Superintendent of the Royal Botanic Gardens at Sibpur alone with the dubious title of the Director of the Botanical Survey of India, which title was continued to be used for several years following, even though the Eastern Survey at Sibpur Gardens came to be left as the only surviving original unit.

Contemporaneous Activities at Calcutta

With the changes in the social structures in England, consequent on the Industrial Revolution, and the transformation of the "trading" Hon'ble East India Company into the "Ruling" Power, the quest for the administration of the colonial subjugated areas had shifted from object of trading to raw materials for commercial exploitation. About 1872, Sir George Campbell, the then Governor of Bengal instituted the formation of a complete collection of commercial and industrial products of Bengal and making it accessible to the public. The collection was to include seeds, grains, fibres, silks. oils, drugs, timbers and minerals. A strong machinery set in working and by a regular influx of products, the BENGAL ECONOMIC MUSEUM was formed in Calcutta in 1874. This Museum soon grew in size and interest. Unfortunately, however, it had many vicissitudes. It had no permanent location of its own in the earlier days, and due to the shifting of this Museum from place to place, its collections had run into a great disorder by about 1879.

About this period, the Government of India were negotiating with the Trustees of the (Imperial) Indian Museum at Calcutta for their taking over the collections of the Economic Museum and maintaining them properly. In 1883 there was an International Exhibition in Calcutta. Various exhibitions were held in Europe and elsewhere for which samples of the products available in India were in great demand. The Committee of the Calcutta International Exhibition obtained the permission of the Government to display the large collections of the Bengal Economic Museum at the Great Calcutta Exhibition, which ran for about a year. A fairly organised effort to find out the economic products of the country was also made in 1887, when Sir George Watt was appointed to compile his own famous and monumental treatise the "Dictionary of the Economic Products of India". One post designated as the Reporter on Economic Products to Government of India being created in 1887, Sir George Watt was appointed to the same and a small department created for him was also placed on a permanent footing in 1895.

After the closing of the Great Calcutta Exhibition, the various industrial collections of the orignal Bengal Economic Museum, were amalgamated with the collections of Indian Museum in 1887. The Economic and Art Section thus created was brought under the Trustees by the Museum Act of 1887. A new wing to the Indian Museum at 1, Sudder Street, was built to house all these collections and by 1891, all the economic products, art-ware, and ethnology collections were removed to this new building. Sir George Watt, who was the Reporter on the Economic Products to the Government of India was also placed in charge of these collections.

At a conference held at the Indian Museum on the 17th November, 1893, with George King as the Chairman of the Trustees of the Imperial Museum, for the preparation of programme for the continued management of the Economic Section of the Museum by the Reporter on Economic Products to the Government of India, decisions were reached to the effect that in the matter of the management of the Economic Section, the Trustees will be responsible through the Reporter, while for the work for the Imperial Institute, South Kensington, the Government of India will be responsible through the same officer. The Reporter's office was also located at the Indian Museum (the then Imperial Museum), with the requisite staff to carry out the dual functions. The duties of the Reporter on Economic Products were to collect and arrange information by means of a system of ledgering of agricultural and commercial products, and to publish the results when enquiries were sufficiently advanced. He was also to collect specimens mentioned in the Dictionary of Economic Products, to identify samples and to give information to correspondents all over India and abroad. The preparation of a permanent exhibit at the Imperial Institute, South Kensington, was also another important function assigned to the Reporter. This afforded a further excellent opportunity for collection of new materials, duplicates of which were retained to build up the Economic Court of the Indian Museum. These collections continued to expand enormously, and selected specimens thereof were exhibited in a systematic way in the public galleries of the Economic Court. Thus the object of this gallery was set out to give in a bird's eye view an illustration of the trade and commerce of the country. It may be mentioned that the Reporter on Economic Products also dealt with questions relating to Agriculture, Forest, Economic Botany, Entomology, Economic Geology, and other cognate matters of economic importance and also had to pass opinion on Industrial and Commercial patents. In subsequent years, quite a lot of valuable Chemical work was also done at the Laboratory of the Economic Section, which by that time had come to be designated as the Industrial Section of the Indian Museum.

Because of the increasing importance of the raw materials such as medicinal herbs and crude drugs, gums and resins, oil-seeds and grains, tanning materials, dye-stuffs, food and fodder materials, etc., there arose a need for an agency to identify the relative Botanical species of plants yielding such products. A Herbarium known as the HERBARIUM OF THE REPORTER ON ECNOMIC PRODUCTS came out of such collections, forming part of the Industrial Section of the Indian Museum.

The work done by the Reporter and his successors at Indian Museum during this period was thus mainly on the utilization branch of Botany, which service had brought to the country and to Science considerable benefit.

AMALGAMATION OF INDUSTRIAL SECTION WITH BOTANICAL SURVEY OF INDIA.

By about 1902, a Central Advisory Board was constituted by the Government of India for the purpose of reviewing and advising generally on the functions of the various departments. The schemes submitted by that Board did not materialise for reasons of financial stringencies. Because of an overlap of functions in respect of the Industrial Section and the Botanical Survey, it was inevitable that there should have been an attempt at co-ordination at some stage. The Board of Scientific Advice which was constituted in 1908 went into the question of the work of the Reporter on Economic Products to the Government of India and recommended that this work which should properly be the utilisation wing of the Botanical Survey of India, should be tagged on to the Survey. As a result, the office of the Reporter on Economic Products to the Government of India, with all his work, was placed under the control of the Director of the Botanical Survey of India and the Industrial Section thus became part of the Botanical Survey from January 1911. Consequential upon this merger, the designation of the Reporter on Economic Products to the Government of India was changed to Economic Botanist to the Botanical Survey of India, and the activities of the officer came to be restricted to the realm of Botany only.

The amalgamation of the hitherto idependent units at the Indian Museum and the Botanical Gardens, which apparently was sought to stabilise the conditions of the Survey, had perhaps achieved a semblance of a scientific stability only, if the results are any index. With the retirement of Mr. D. Hooper, who was the Economic Botanist to the Survey till 1st February 1914, the chemical part of the work hitherto done at the Industrial Section of the Indian Museum, had ceased and the laboratory attached to the Industrial Section was also dismantled. The altered set-up of the Survey had also been not conducive to the increase in activity. No large scale survey appears to have been undertaken after this coalition.

Review in Retrospect

The infructuous attempts made at various times to consolidate the position of the Survey would perhaps present a dismal picture of the status of the Botanical Survey. It would not, however, seem equitable to judge the institution by its disastrous episode alone, accelerated by causes, both intrinsic and extraneous. A correct perspective of the Survey can be had only when the real contributions it had made to the Indian Botany is reviewed against the setting of the series of adverse circumstances under which it was obliged to fulfil its great mission.

As already pointed out, at the time when the Survey was organised in 1890, it had no separate staff of its own. It had to get its work done through various agencies, by co-ordinated efforts only. When a huge collection of specimens had accumulated after a number of years of continuous process of explorations, there came up the need for maintaining them efficiently under a systematically classified manner. By about the year 1910 only, a small complement of staff with two Systematic assistants, a Photographer, and a Clerk, was made available to the Survey, which was the first staff that the Survey could claim of its own.

It is also to be mentioned here that when the Botanical Survey of India was created in 1890, the respective Regional Surveys were controlled by officers preoccupied with teaching work, and therefore the Survey work was done at week-ends on a purely honorary capacity (e.g. Western Survey), or that the officers had to devote all their time to their own other legitimate works in connection with the Forest Research Institute, or inspection of various Botanic gardens and parks attached to them (e.g. the Northern Survey), and therefore had not that much of time necessary for the Survey work proper.

The Government of India appointed early in 1901, Dr. E. J. Butler as Cryptogamic Botanist and on his arrival at Calcutta on April 5, 1901, he was attached to the Botanical Survey of India, in which capacity he served throughout the financial year 1901-02. He did much excellent work which proved to be of a useful and practical nature. Subsequently, however, as it was found undesirable that the Cryptogamic Botanist should continue to be an officer of the Botanical Survey, his connection with the Survey was severed in 1902, just after one year of his association with the Survey.

The changes effected by the respective Provincial Governments in respect of the administrative set up, had also considerably affected the progress of the Botanical Survey. For instance, the withdrawal of the officers doing also Survey work, and transferring them solely to provincial duties as Economic Botanists to the respective Governments, as was done in the cases of the Bombay and Madras Governments, had materially retarded the exploration work to be done by the respective Governments under the scheme.

With such changes, and there being no official agents for conducting systematic explorations and collections in the Northern, Western and Southern Surveys, such work had to be got done by persons quite unconnected with the Survey, as Officers of the Military, Forest and Agricultural Departments, native collectors and others.

The Survey appears to have had a shaky position in respect of finance also. In 1890, when the Survey was formally constituted, in the first instance, for botanical explorations of Assam and Burma, which was then added on to the Eastern Survey at Calcutta, a sum of Rs. 1,000/- was allotted to the Eastern Survey at Calcutta, by Government of India, and each Province concerned, also contributed an additional sum of Rs. 500/- thus making a total grant of Rs. 2,000/- per annum. This grant lasted for the years from 1890 to 1st April, 1910, at which latter date, the provincial grants were discontinued. In their place a sum of Rs. 5,000/- was allotted for explorations, travelling allowances and other contingencies for the Eastern Survey. With the amalgamation of the Industrial Section with the Botanical Survey of India in 1911, and the Superintendent of the Royal Botanic Gardens continuing also as the Director of the Botanical Survey, a small allowance was given to him by the Government of India for dealing with the Government in relation to Survey work and also with other officers of Government of India. From 1891 to 1903, the Government of India also paid the Director of the Botany Department of Northern India and his staff at Saharanpur, an annual expenditure of about Rs. 22,000/- and in 1903, this was restricted to Rs. 1,000/- per annum. On the abolition of the post of the Director of the Northern Survey, held by Duthie, the Herbarium attached to the Survey was placed *pro-tempore* under a care-taker, and ultimately in 1905, the Provincial Government of U.P. took over charge of the Herbarium with its staff, from which year the cost in connection therewith was provided in the budget of the Provincial Government.

The other two Surveys at Madras and Bombay had neither staff nor funds specifically provided by the Government of India for the Botanical Survey work required to be done by them under the original scheme.

The reactions of the various Provinical Governments as revealed through their decisions to terminate the arrangements made earlier for the Survey work in respect of their regions, would seem to be incompatible with the need to invigorate the run-down scientific progress. Their reluctance to accept responsibilities on their own avowed policies and principles, in the matter of the general interest of the country's needs in scientific developments and economic resourcefulness, had forced the Survey to work out its own destiny.

BOTANICAL DOCUMENTS HERBARIA AND SCIENTIFIC RECORDS

Despite the adverse circumstances under which the Survey had to function at various times, its botanical achievements were really commendable. As already mentioned, each of the Gardens at Calcutta, Saharanpur, Bombay and Madras, which were organised in the early years of the Hon'ble East India Company, had its own nucleus of a Herbarium, i.e. a collection of dried plants for reference and research purposes. The progress made in each centre in respect of enlarging the collections of these Herbaria through explorations, had been spasmodic, dependent on the personalities of the people in charge. Of the four Herbaria mentioned, the one at Calcutta came out to be by far the greatest and most valuable of all. The history of each of the Herbarium is set out in the following pages.

The Calcutta Herbarium

It is possible to consider this Herbarium under three phases, determined by certain important incidents, which had a pronounced influence on its growth and development.

First phase, 1786-1828: This period covers the history of the Herbarium right from its inception to the days of Wallich.

The Hon'ble East India Company Gardens at Sibpur

Calcutta, provided the nucleus for this great Herbarium. The Garden was started by Col. Kyd in March 1786, and collections of plants from different parts of the East were soon introduced into it with such success that the number of plants brought into it in eight years amounted to more than three hundred. In the first instance, the Herbarium at Calcutta Gardens consisted of a small quantity of specimens that had flowered in the Gardens itself, dried and preserved. Col. Kyd was succeeded by Dr. Roxburgh as Superintendent of the Gardens at Calcutta on the 29th November 1793. Roxburgh was a most ardent and enthusiastic botanist of great eminence. He soon attempted a systematic account of the plants of India. The collection of plants made by him during his tenure of Superintendentship from 1793 to 1813 were also added on to the Herbarium at the Gardens. Ultimately, this Herbarium came out to be a reference library of dried plants, so dear to every botanist who is faced with the taxonomical problem of identification. The number of described species in the garden by then amounted to a few thousands, among which there were a number of new genera, some of which having considerable number of species determined. Roxburgh had also prepared in duplicate sets, a series of illustrations, numbering about 2583, which for their accuracy are remarkable, ranking with the classic work of Rheede. One set is still to be seen in the Sibpur Garden Herbarium, while the other set was deposited in the India House, London, at intervals between 1790 and 1812. A set of 300 drawings and descriptions were published as "Plants of the Coast of Coromandel" by Sir Joseph Bank in three volumes, between May 1795 and March 1820. About 400 of Roxburgh's drawings were reproduced in Wight's Icones Plantarum Indiae Orientalis, published between 1838 and 1853. The set sent to India House was subsequently transferred to Kew, to which institution the manuscript of Roxburgh's Flora Indica was also presented by Roxburgh's son, in 1872. Indian Botany thus owes a great debt to Roxburgh for his indefatigable and discriminating researches.

Roxburgh maintained also extensive correspondence with gentlemen in all parts of India and most parts of the world. This ensured a long list of donors to the Garden which he superintended. Authentic specimens of each species and every collection sent to England by order of the Government were also systematically kept for record purposes in the Calcutta Herbarium. Considerable number of Roxburgh's specimens are still to be seen in the British Museum, London, Linnean Society and University of Edinburgh. Botanically, the Calcutta Herbarium came out to be the most important feature in the Gardens. Roxburgh left Calcutta in 1813. In subsequent years, extensive additions were made to this Herbarium, and through the botanic labours of Finlayson, Wight and others, great quantities of specimens accumulated for years from all parts of India and British Empire, and even from foreign countries. Thus this "Public Herbarium" grew in size and importance. The tempo of activities seen in the Gardens during the time of Roxburgh had continued quite unabated during the periods when the Garden was under the charge of such indefatigable workers as Dr. Buchanan Hamilton and Dr. Nathaniel Wallich, the last mentioned being noted not only for his attainments as a scientist but also for his inimitable initiative for making his results known to the public. Wallich was a most complete taxonomist of the Linnean school. He became the Superintendent of the Gardens in 1817. With him botanical expeditions gained tremendous impetus. He organised during his term of office (1817-1843) expeditions to Kumaon, Nepal, Gilgit, Tenessarim, Penang and other places. During this "Botanical Survey of the British Empire", huge and priceless collections of specimens were added to the herbarium. No wonder, therefore, that the collections of dried plants began to swell and to transcend the regional limits, to cover as far as possible complete species wherever found. In his zeal to further the cause of science, most of the collections at that time, not only those collected by Wallich himself, but also those of Roxburgh, Buchanan, and others were taken away by Wallich to London in 1828, and after naming all the plants by himself and by other specialists, they were distributed, at his suggestion, of course under the orders of the Hon'ble East India Company, to the principal institutions and botanists in Europe, leaving almost nothing behind at the Calcutta Herbarium. One complete set seems to have been given away to the Linnean Society, London, (which, however, after 1913, is understood to be transferred to Kew). The distribution of Wallichian herbarium all over Europe enabled, no doubt, workers to obtain access to a set of those specimens, and very soon this Wallichian Herbarium became one of the foundations of Indian Botany. Wallich also took away with him to England, a large collection of valuable series of botanical drawings prepared under his supervision, between 1815-1828. These drawings were also deposited by him at the India House. 300 drawings selected out of this set, were published under "Plantae Asiaticae Rariores", a superb work indeed, like its predecessors. Wallich had also prepared a catalogue of his collections, which in the Manuscript form is still preserved in the Sibpur Herbarium, as the famous Wallichian Catalogue, an indispensable reference for researches on original taxonomical problems.

It is to be mentioned that within fifty years of its life, the Herbarium was denuded of its priceless possessions. Between the time he left India for Europe in 1828, and his return to Calcutta back in 1832, deterioration was evident in many directions. The records maintained for the determination of the species together with the Library, became so completely confused and disorderly that even Wallich himself had considerable trouble in deciding what the names should be of his own plants. The Linnean Garden, i.e. several plants grown in the garden exhibiting the Linnean System of Classification, laid out earlier by Roxburgh was also in great disorder—events which would portend in the normal course a dead-lock for Indian Botany, particularly Taxonomy, from this hitherto great institution.

Second phase, 1832-1890 : This covers the period from the last days of Wallich to the foundation of the Botanical Survey.

Indeed the spirit in which the collections in the Herbarium were handled and disposed of by Wallich indicated that Dr. Wallich must have felt himself as being entitled to deal with it as he liked, because of his own labours in their acquisition and scientific determination. During the absence in England of Wallich, from the middle of 1842, on grounds of ill-health, Dr. Griffith was officiating for Wallich, from the end of that year. Wallich ultimately retired in 1846. Griffith was a thorough botanist with very high attainments. He had actually complained of the deterioration of the Herbarium and the Garden to the Hon'ble East India Company. He vigorously set out to recover a portion of the materials sent out and preventing the dispersal of further material. In this, he was succesful to an extent. He wanted to lay out again the Linnean garden as also a garden under the "Natural System". He spared no pains to build up a working Herbarium which he styled as a "Public Herbarium", and the results were most encouraging. The very first noteworthy additions to this Herbarium on revival, were those of Rottlers specimens from Carnatic, which were given to Wallich, who brought them with him from Denmark on his return to India in 1832. Towards this public herbarium, Griffith put aside a considerable part of his own duplicates—rather triplicates. Griffith brought with him a few of Wallichian herbarium from England, which were also incorporated. He also caused a local herbarium being organised alongside the Public Herbarium, the former being characterised by the several species typical of a particular locality of origin, thus more or less representing a regional herbarium. From the collections at the Calcutta Herbarium, he prepared also sets for the Saharanpur and Bombay Botanical Gardens, obviously as a safeguard against any eventuality that might face the Herbarium similar to what had occurred at the end of Wallichian period.

The years subsequent to 1832 saw substantial additions to the Herbarium, because of the activities of innumerable collectors all over the country and abroad. Under the able management of successors to Wallich like Griffith, Falconer, T. Thomson, T. Anderson and others, great progress was evident. The composition of the herbarium became also such as to win for it a unique distinction once again, of being the fore-most Indian Herbarium. Several were its benefactors. The Kew Garden authorities regularly sent several specimens from their collections. The Forest departments contributed also much from different areas in India and Burma. Several European species were obtained for this Herbarium through the munificence of J. D. Hooker. Among the numerous valuable collections received as gifts, the following were notable ones. Aitchison's Kurram Valley plants ; C. B. Clarke's Indian plants ; Brandis' Burmese plants ; Gamble's Sikkim, Duar and Orissa plants ; Fischer's Garo plants ; J. D. Hooker's sets of Afghan Expedition plants, collected by Aitchison ; Watt's Sikkim plants ; Bossier's European and N. African plants ; Ferdinand von Mueller's Melbourne and Australian plants ; Kunstler's Malayan plants ; Prof. Engler's sets of named Aroideae ; Giles' Gilgit Expedition collections ; D. D. Cunningham's E. Tibetean plants ; Rogel's Russian possessions of Central Asian plants ; J. D. Hooker's type sheets of Euphorbiaceae ; Kerner's Austro-Hungarian plants ; Blytt's Norwegian plants ; European Grasses, presumably purchased by Wallich ; De Candolle's Swiss and French plants ; Scott's British Ferns ; Pappa's Cape plants ; M'Murray's Mauritius plants ; Fischer's Asiatic Russian plants ; Vicary's New South Wales plants ; New Holland specimens from Hookerian Herbarium ; William's complete set of U.S.A. plants ; Carson's North American plants ; other presentations from British Museum, Jardine des Plantes, Paris, from Berlin, from Royal Botanic Gardens at Buitenzorg, Java, Ceylon etc., as also from individual renowned collectors as Vicary, Edgeworth, Wight, Simms, Lawson, Gibson, Stocks, Dalzell, Kurz, Miquell, Maingay and others. The Herbarium thus grew out in size and importance, having representative collections from S.E. Asia, Japan, Persia, Asia Minor, Europe, Australia, Africa, America. Thus after Wallich, within a period of half a century, the Herbarium made a creditable record of acquiring for it over ½ a million specimens by 1890. Somewhere about 1857, some of the collections were arranged according to countries as Assam, Khasia, Moulmein, Pegu etc., and complete sets, of specimens of selected species were arranged to form a general standard herbarium.

In the earliest stages, at the time of Roxburgh and Wallich, the Herbarium was situated in the basement of the Superintendent's house which was built by Government for Roxburgh in the year 1795, the top storey being used as living quarters. Griffith directed his efforts in placing the "Public Herbarium" which he revived, in the top storey of the Superintendent's house, for the reason that that situation was airy. However, with the rapid increase in the collections, the question of proper accommodation for the Herbarium and the Library assumed greater and greater importance, as the building in which they were then located

The famous house built for Roxburgh, was the birth place of the renowned NATIONAL HERBARIUM.

The INDIAN MUSEUM house, where the Re-organised Botanical Survey started functioning in 1954.

proved small and inconvenient in many ways. In 1874, Sir George King, who was then the Superintendent of the Gardens, sketched out many improvements in the gardens for the approval of the Government. This *inter-alia* included laying out of wide roads and numerous footpaths and underground pipes connecting the many artificial lakes. The plan for a new Herbarium Building was also included in this project. The new building was designed by E. J. Martin, the then Government Architect, the internal arrangements of which were to a considerable extent adapted from those of the new Herbarium Building at Kew then. The structure was designed to be built on open flue-arches, seven feet high, and thus well raised above the ground. Internally the building was designed to have a single hall, 115 feet long by 44 feet broad, and round the sides and ends of this hall, at 11 feet from the ground, a continuous gallery of 15 feet wide was also provided, with spiral staircases at two sides. The whole building was designed to be of masonry and iron and thus practically made fire-proof, except for the wooden doors and windows. The foundation of this new building was laid towards the end of 1881-82, and by 1882-83, the valuable collections of dried plants were removed to the new building, and housed there in 93 cabinets. With the Herbarium, the library also moved into the new building. The Herbarium became once again the centre of Botanical studies, particularly in systematic Botany.

It would be of interest, incidentally to refer to a transformation that underwent the Garden during this period. The Garden, as already stated, was initiated by the East India Company. It continued to be under the Government of India for several years. But only after Lord Campbell's term of office as Governor of Bengal it was proposed to make the Garden a provincial subject, and from about 1877 the Garden was provincialised.

Third phase, 1890-1954 : The formation of the Botanical Survey of India as an Imperial Department in 1890 marks the beginning of the third phase of the Herbarium. By this time, an interest in various local floras had been awakened, and several botanists were actively engaged in such works. The herbarium work also naturally increased considerably, in not only comparing and determining the plants, but also in distributing and exchanging plant specimens of various types. In the earlier stages the tempo of activities in the herbarium had gathered considerable momentum. There had been rapid accumulations of collections to the herbarium and the library. It is significant to mention here that in 1890-91, a large number of books were received from the Director, Royal Gardens at Kew, which publications were of great interest and importance, they being the duplicates withdrawn from the Library of that great institution. Numerous herbarium collections were also continued to be received quite uninterruptedly for several years. Among the important additions, mention may be made of the collections from Kew, Smithsonian Institute of Washington, Tibetan plants of E. Drake del Castillo of Paris, Heller's Hawaiin plants, Maynard's valuable collections made during his delimitation of Baluchistan Afghan Frontier, R. Pantling's large collections of Sikkim Orchids, J. L. Walkers' Mosses, Swiss plants from Cantonol Museum Fribourg, A. Henry's Chinese plants, H. Bolu's gift of S. African Orchids, collections made during the Botanical Survey operations in Tibet in connection with the Frontier Mission, gifts from Natural History Museum, London ; Royal Herbarium, Berlin ; Botanical Museum, Vienna ; Botanical Gardens, Zurich ; Alcock's collections of Palmir Delimitation Commission, U.S. Natural History Museum, Department of Agriculture, Botanical Gardens, Sydney, Singapore and Harvard University, Stanford University, California, as well as from the Botany Departments under the Botanical Survey of India.

It is evident that since 1890, the collections to the Herbarium had increased "prodigiously" and by about 1904-05, the 186 cabinets which they filled in 1890, were found overflowing and many thousands had therefore to be piled on tables and floor of the Herbarium building. By this time the collections had swelled up to nearly a million specimens. With the special grant allotted, the herbarium was completely reorganised in 1904-05, all the old cabinets having been replaced by large double sided cabinets, built in four sections, and each cabinet having a capacity ½ as great as the old ones. About 32 such new cabinets were made to accommodate a total capacity of over a million specimens in the gallery on the top, the place where the Public Herbarium was originally installed. The replacement of the old cabinets with new ones were followed in the ground floor of the Herbarium Building, in subsequent years for the local herbaria and the unclassified collections.

The huge contributions from private sources and the outlying parts of the country must have focussed attention on the needs for systematic classification and cataloguing of the specimens which work apparently had to be dependent on the personal initiative and interest and zeal of the men who held charge from time to time. In 1905-06, a beginning was also made for the preparation of card-index of orders, genera and species in the Herbarium, numbered according to the Bentham and Hooker's Genera Plantarum and Hooker's Flora of British India, to facilitate direct reference to the Herbarium shelves. Also, the index of new species of plants which were published monthly by the Herbier Bossier in Switzerland, in the form of oblong slips were also converted into card catalogues and they were also maintained in specially made cabinets.

After 1916, the activity in the Herbarium had actually dwindled because of the curtailment of funds and other factors. Diversions of the activities of the Botanical Survey from the more important work connected with explorations and survey of floras, to purely Cinchona work, had also directly affected the progress of the herbarium after this date. Yet in 1944, the Herbarium was stated to have about 2½ million specimens.

The Saharanpur Herbarium

As in the case of the Calcutta Herbarium, the Hon'ble Company's Botanic Gardens at Saharanpur provided the nucleus for the Saharanpur Herbarium. The Garden was of about 40 acres of land, with sections for the Linnean Gardens, Agricultural and Horticultural nurseries etc. In the beginning, this garden was also developed as a scientific institution. For the furtherance of the objects of this garden, at the time of J. F. Royle, parties were sent out regularly to various places such as Dehra Dun, Kashmir and other Himalayan regions for collection of plants, and catalogues were also prepared of the plants which the gardens came to possess. Such collections were made from 1824 onwards and within a decade from that date, the catalogue consisted of upwards 4000 species and about 30,000 specimens. These, together with a complete set of the collections made at the instance of Royle and others, while connected with the Saharanpur Gardens, were left by Royle under the care of Falconer, who succeeded Royle, at the Gardens. Thus a very valuable herbarium came to be established. The whole of the plants of the herbarium were then arranged under two catalogue systems, one according to the Linnean or artificial classification, and the other according to the Juissieuan or natural method. For many new plants, drawings were also made by engaging painters for the purpose. The Gardens at Saharanpur thus contributed much to the progress of Botanical Science. As years rolled on, collections to this Herbarium increased. The Calcutta Herbarium also sent from time to time duplicates from its own collections.

Subsequent events were rather intimately connected with the Forest Research Institute at Dehra Dun, and therefore, a short reference is made to the Herbarium of that institution.

In 1878, an Imperial Forest School was founded at Dehra Dun. Later, a scheme was submitted for raising the status of that school to that of a College, and at the same time for establishing a Forest Research Institute. This scheme ultimately received the sanction of the Secretary of State for India and the Forest Research Institute was established by the Government of India on the 5th June, 1906. The scheme for the new Institute *inter alia* provided for an Imperial Forest Botanist to study the botany of the Forest plants, the disease of the trees and the distribution of the species, and an Imperial Forest Economist, who will make forest produce of all kinds available at the lowest cost to consumers. The original forest school had a small herbarium. Through the labours of the Forest Botanist and a team of forest officials, this herbarium was subsequently considerably expanded.

When the Botanical Survey was being inaugurated in 1890, the Saharanpur Gardens was in charge of J. F. Duthie, who was also a part-time lecturer in Systematic Botany at the Forest Research Institute, for which he received an honorarium varying from Rs. 150/- to Rs. 250/-. The Northern India Survey was created under the Botanical Survey, with this garden as the principal centre of activity. Duthie was also the first Director of the Northern Survey. This Survey had the advantage of the servicies of the officers in the Military Expeditions along the North-western Frontier Provinces, who materially contributed to its collections. Some among its valuable collections were those of Capt. Younghusband's Chitral plants, and complete set of Kashmir and Baltistan plants, with many new to science, Waziristan (11,500 ft.) plants, J. Alcock's collection during the Pamir Delimitation Commission, Harris' Chitral Range Expedition collections (12,000 ft.), Milne's Khyber Pass plants, Capt. Skey's and Wright's Chitral collections, Orchids from N. W. India, American grasses from Washington as also foreign plants from New Zealand and America and other places. The collection of Mosses at Saharanpur was considered as one of the greatest value for reference purposes and in this the N.W. Himalayas was stated to be richly represented. Exchanges were made with British Museum, London, and other European countries, which brought for this Herbarium some valuable and interesting collections.

As the value of this herbarium increased, attempts were made in 1894-95 to set up a separate Herbarium to represent the Flora of North West and Central India. Also a separate Herbarium was initiated in 1893-94 for Economic plants, in which the specimens were arranged alphabetically A to Z, according to Watt's Dictionary of Economic Products, mainly for references connected with Agricultural Botany.

The Northern Survey, however, severed its connection with the Botanical Survey of India, on the retirement of Duthie on 31.12.1902. The herbarium and the Gardens attached to the Survey were placed *pro-tempore* under a caretaker. By about 1905, the Herbarium appears to have been placed under the charge of the Economic Botanisit to the Government of U. P. On July 25, 1908 R. S. Hole, who was then Forest Botanist attached to the Forest Research Institute, took over charge of the valuable Saharanpur Herbarium. The entire collections were thereupon removed to Dehra Dun and housed there. By April, 1909 the Saharanpur herbarium was amalgamated with the Forest Research Institute Herbarium. The Library at the Saharanpur was originally removed to Cawnpore and placed under the charge of the Economic Botanist to Government of U. P. Ultimately, however, about 400 valuable volumes from this library were obtained in 1909 for the Forest Research Institute, as having a bearing on the Herbarium which they had taken over. Since amalgamation, the Saharanpur Herbarium had remained as an integral part of the Forest Herbarium at Dehra Dun.

The Bombay Herbarium

The Western Survey initiated its activities at the Science College at Poona. Dr. Cooke was the first Director of this Survey and he was succeeded by Marshall Woodrow and Gammie. Collections were received for this Herbarium from the Calcutta Herbarium and from other sources as well. The Herbarium with its contents was completely destroyed by fire on the 1st May 1902. The buildings and fittings had therefore to be reconstructed. Attempts were made to restore the herbarium to its former high standard by acquiring specimens from various sources. Initially Dr. Cooke presented quite a large number of specimens from his own herbarium. Woodrow sent from his herbarium, grasses and sedges. Jenken offered Nilgiri plants, and Ryan and others helped similarly to build up this Herbarium again. And within a year, about 14,182 specimens were accumulated for this herbarium. Ultimately this Survey also got separated from the Botanical Survey by about 1908, and the Economic Botanist of the Province held charge of the possessions immediately thereafter.

The Madras Herbarium

The Madras Survey appears to have been a part of the Botanical Survey only in name. All the work done there were done quite independently. The Herbarium in the South came under the care and management of renowned Forest officers and Economic Botanists, so much so, ultimately it became associated with the Agricultural College and Forest College at Coimbatore, which was the principal centre of activities in these respects.

Scientific Records

The most significant publication of the Botanical Survey of India is the "Records", the first number of which came out in 1893. The circumstances that led to these publications are clearly set out by Sir George King, the first Director of the Botanical Survey, as in the following:

"The project for a Botanical Survey of the Indian Empire now taken shape, it is considered desirable that there should be some special channel through which the results of the Survey may be communicated to those interested in the progress of Botanical Science. It has, therefore, been decided to issue under the title of "Records" such reports made by officers of the Survey and shall contain matter of Botanical interest or novelty. These records will be published, not at fixed intervals, but from time to time as appropriate materials may be received."

The "Records" dealt with very many topics, chief among which were Botanical tours and expeditions, floras, descriptions of new species, local floras and scientific information of topical interests, monographic works and revisions, taxonomical problems, economic and vegetational information and others of miscellaneous interests. Even Floras of foreign countries have been communicated through these records as in the Flora of Aden and Arabia by E. Blatter. The "Records" had a good distribution, both in India and abroad, and many institutions exchanged their own scientific publications with the "Records" of the Botanical Survey.

Besides the "Records", the Botanical Survey of India published its own Annual Reports, featuring its activities. The first three years' reports were perhaps never printed, and are to be seen in the calligraphy form only.

Survey's Influence on Regional Floras

Prior to the inauguration of the Botanical Survey in 1890, there had been a large number of contributions by numerous workers on the floras of many local areas. In certain cases, the Calcutta Harbarium had been more or less directly or indirectly connected with such works. Among those, mention may be made of the Flora of Upper Assam by Griffith (1836); Naga Hill Flora by Masters (1844); Banda District Flora by Edgeworth (1852); Moulmein Flora by Parish (1859); Bihar and Lucknow Flora by Anderson (1863); Burmese Flora by Kurz (1863); Jhelum Flora by Stewart (1881); Darjeeling Flora by Gamble (1875-76); Jeypore Flora by Beddome (1879); North Western and Central India Flora by Stewart and Brandis (1874); Rajputana vegetation by King (1878) and others. But a direct and positive influence is definitely to be seen in the compilations of the compendious floras on Upper Gangetic Plains by Duthie and the Flora of Bombay by Cooke, the two authors having been the first Directors of the respective Surveys of the Northern and Western India, and who had the directives from the Government of India for the compilations of these floras, which were projected by the Director of the Botanical Survey at Calcutta. There had also been several similar projects under the Survey and the whole scheme of writing up of floras of different regions may be summed up as an experiment in the botanical pursuits on Indian Systematic Botany, which while incorporating a number of new approaches and methods, would combine the traditional system as exemplified in the monumental work of Flora of British India, by the illustrious author, J. D. Hooker, describing the plant species from over a very extensive area.

Subsequently, however, there had been an ebb in enthusiasm for expeditions, and no large scale surveys were undertaken. Consequently, the writing up of floras had received but little attention.

Cinchona work takes the lead

There were other factors also which had affected the progress of the Survey. The development of the Forest Research Institute and the Indian Institute of Agricultural Research with their coverage of the topical utility aspects of the plant kingdom, which should normally have been part of the activities of the Survey stunted the development of the department. Cinchona had been introduced in India as far back as 1861 in Nilgiris, South India. A plantation was started in 1882 in Mungpoo and afterwards there was also a factory at Mungpoo for the manufacture of Quinine. The outbreak of the first World War disrupted the supply of Quinine to the World in general and the British Empire in particular. In 1916, the Government of India desired to explore the possibility of extension of cultivation of Cinchona in India with a view to meet not only the whole requirements of the country, but also the greater parts of the needs of the British Empire. Lt. Col. A. T. Gage who was Superintendent of Cinchona cultivations in Bengal, and more closely associated with the Government of India than any other officer available at that time, because of his honorary designation as Director, Botanical Survey of India, was entrusted the problem. He reported favourably in 1910 on the possibility of successfully cultivating Cinchona on a large scale near Tawai in Burma.

The Mungpoo factory was also expanded to produce more quinine by importing Cinchona bark from Java. Quinine sulphate was also imported as such for distribution in the country. This import was being done by the Government of India on behalf of the Association of Quinine Manufacturers in the allied countries. The Mungpoo factory itself was part of the Bengal Government establishment, but the cost of manufacture was met by the Government of India in full. The handling of the Cinchona bark appears to have been done in the Industrial Section of the Indian Museum, Calcutta, which had become part of the Botanical Survey of India by this time.

Cinchona cultivation in Burma entered into an active phase from the year 1920. About 50 acres were brought under cultivation in that year, 250 acres were planted in the year 1921-22 and by the end of 1922-23 this was extended to 1250 acres. The survey seems to have been pre-occupied with the Cinchona work only after the year 1916.

Since the introduction of Cinchona into India, the Government of India had all along controlled the Cinchona policy with reference to India as a whole. The bark production and quinine manufacture were entrusted to Governments of Bengal and Madras. As already mentioned when the War broke out in 1914, quinine work also came under the Botanical Survey to some measure. The functions of the Director, Botanical Survey of India, in relation to the Government of India were defined as (1) to advise the Government of India in regard to quinine policy, to administer their cinchona plantations, to look after the production of quinine on their behalf and to control the disposition of their stocks of the drug, and (2) to supervise their botanical work, both in its economic and systematic aspect. Mr. P. T. Russel who was then the Manager of the Bengal Government Cinchona Plantations at Mungpoo and Mr. G. E. Shaw, Government Quinologist, Bengal, were attached on deputation to Botanical Survey in the early quarter of the year 1919, to assist the Director of the Survey in the selection of suitable sites for starting Cinchona plantations and for the erection of a factory. Specific grants were made for the Cinchona work in the Survey Budget for some years. Nurseries were set up and the plantations went on progressively. Simultaneously, cultivation of Ipecacuanah was also experimentally started in the Cinchona areas by about 1921, in South Burma. Subsequently as conditions in Tawai proved unfavourable, new areas for cultivation of Cinchona were explored and the centre of operation was shifted from Tawai to Nyaungbinkwin, south of Tenasserim Hevea Plantations. Extensive cultivations were started in the new regions.

Besides cultivations, by terms of certain agreements entered into between the Secretary of State and the Dutch Combine, in respect of procurement of bark and quinine, Cinchona bark and quinine sulphate were also purchased from Java. This agreement, which came into operation by the 8th April 1921, lasted till the close of the year 1923, during which period, barks amounting to 777,035 lbs., and 608,103 lbs., were purchased for the years 1922-23 and 1923-24 respectively. In subsequent years, the quantity of bark received from Java came down appreciably, in the range of about 250,000 lbs. on an average for nearly five years, after which from 1929-30 onwards no import was effected of this commodity. The bark obtained by the Government of India was worked up in the Bengal Government Quinine Factory at Mungpoo. The Imperial stocks of bark and quinine sulphate were maintained at the Industrial Section of the Indian Museum, from where all large indents for cinchona febrifuge and quinine sulphate were met. Sale and supply of Cinchona products continued to be performed by the Survey from the Industrial Section till 1944, when the Cinchona work also got out of the Survey and the Quinologist to the Government of Bengal became the Principal Quinine Officer of the Government of India. This left the Botanical Survey with the only two units, the Systematic Division at the Sibpur Gardens and the Economic Section at the Industrial Section, Indian Museum with work purely of a routine nature and as related to each.

The economic stringency prevailing in the country in 1930, resulted in the overall retrenchments in 1931, which further affected the Survey considerably. Also with the forging ahead of the Imperial Council of Agricultural Research Institute and the vesting in it of the functions of plant breeding, improvement and plant introduction, the fundamental key-note of the earlier days of the Botanical Survey, viz., plant introduction, field survey and commercial exploitation of plant species, appear to have been lost sight of. The Survey was ambling on with very limited activities in the years to follow.

Botanical Survey (1937-1952)

Mr. C. C. Calder was the last incumbent to the post of the Director, Botanical Survey of India. Just about the time of the retirement of Mr. Calder, the administrative set up of the Survey which hitherto had the Superintendent, Royal Botanic Gardens (Bengal), a provincial officer, as the ex-officio Director of the Botanical Survey of India, an Imperial Department, was reviewed. The Government of India with their letter dated the 17th August 1936, communicated the sanction of the Secretary of State in Council for the separation of the post of the Superintendent, Royal Botanic Gardens, Sibpur, Calcutta and Director, Botanical Survey of India, Calcutta, with effect from the date of retirement of Mr. Calder in order that the Government of Bengal and the Government of India may be free to appoint the men most suitable for the work of their respective posts. On the effective retirement of Mr. Calder in 1939, the arrangement of having the Superintendent of the Royal Botanic Gardens as ex-officio Director of the Botanical Survey terminated, and the post of the Director, Botanical Survey, which came out to be a separate and independent post, was never filled up. That was kept in abeyance and the duties of the post were divided among the Curator, Industrial Section, Indian Museum, the Superintendent, Royal Botanic Gardens and the Quinologist from even the 13th October 1937, the date on which the leave preparatory to retirement of Mr. Calder was sanctioned. The work of the Quinologist appears to have increased in its own lines and the entire work relating to this aspect broke off from the Survey in 1944.

The Herbarium at Sibpur, as already stated was started in the days of the East India Company. When the East India Company wound up, the property was taken over by the Imperial Government. When the Botanical Survey of India was instituted in 1890, there was a huge collection under an officer, the Curator of the Herbarium. With the establishment of the Botanical Survey, this was further augmented by the collections received from the Directors of Botanical Surveys of Madras, Bombay and North West Frontier Provinces. The Royal Botanic Gardens which was started by the East India Company, was subsequently maintained by the Imperial Government till 1887 when the garden was provincialised. There is no such reference to the Herbarium. But the Botanical Survey was included in the exclusive Federal Legislative List, on the introduction of the Provincial Autonomy, and the Government of India Act, 1935. It would be relevant to mention here that the collections of the Herbarium were taken to Darjeeling during the World War II, as a measure of protection against damage and loss arising out of possible air-raids, and then back to Calcutta at Central Government cost. The Herbarium contains a very rich collection and is invaluable and even indispensable for the Botanical Survey.

The successive events in the 1930 and thereafter, in respect of the Survey could reflect on the state and progress of the department, to be dismissed as moribund or in a process of disintegration. However, several extraneous influences helped to maintain a sustained interest in the Survey of the flora of the country for academic and economic purposes. At the Imperial Botanical Conference held at London about 1924, at the time of the Wembley Exhibition, there had been deliberations to ensure best means of promoting a complete Botanical Survey of the British Empire and it was resolved therein to form a central body to co-ordinate certain lines of Botanical Researches throughout the Empire. This must have had a pronounced influence in revitalising the Botanical Survey. Many schemes have been forwarded by many people and institutions in regard to the Survey. But economic stringency in the earlier years seemed to frustrate the aspirations of the Government in reorganising the Botanical Survey. However, after the World War II, and the attainment of Independence, the rising social and economic aspirations of the Free India provided the essential opportunity for scientific advancements and economic developments. And by the early part of the year 1952, the proposal for reorganisation and expansion of the Botanical Survey appears to have assumed a degree of reality.

When the proposals were under the active consideration of the Government of India in 1952-53, the Survey consisted only of the Industrial Section, Indian Museum and the Systematic Division, Indian Botanic Garden with an overall budget of about Rs. 1½ lakhs.

THE REORGANISATION

One post designated as Officer-on-Special Duty was temporarily created by the Government of India, to help them to draft a suitable plan for the reorganisation of the Botanical Survey of India. Dr. E. K. Janaki Ammal was appointed to that post on the 14th October, 1952, and a small office was also created for her. That office was located, with the consent of the Trustees of the Indian Museum, in the wing of the Museum House on the premises of the Indian Museum, at Calcutta. The plan drafted by that officer having met with the approval of the Government, the President's sanction for the expansion and reorganisation of the Botanical Survey of India was communicated with the Government of India's despatch dated the 29th March, 1954. The sanction included the setting up of the following organisations:

1. A Headquarters establishment under a Chief Botanist at Calcutta, for controlling and co-ordinating the activities of the various units of the Botanical Survey of India and for implementing the policy laid down by Government.
2. Four regional circles based on Phyto-geographical affinities, namely Eastern, Western, Northern and Southern Circles, with their Headquarters at Shillong, Poona, Dehra Dun, and Coimbatore respectively, each under a Regional Botanist, who will be responsible for the Survey of the region, and will utilise the facilities provided by the States and Universities.
3. A Central Botanical Laboratory under a Director at a suitable place in U.P. where the living plant will be studied in relation to its Botany and utility to the Nation.
4. A National Herbarium which will house the Type specimens and a fully representative collection of the plants comprising of flora of India.
5. Maintenance of a Botanical Museum on modern lines at Calcutta.

In the actual functioning of the reorganised Survey, it was envisaged that the Botanical Survey will collaborate with Universities and Research Centres in the country by encouraging research students in the Universities to take studies of problems relating to the flora of India. It was further envisaged that the Botanical Survey of India will also collaborate with the various State Governments utilising fully whenever possible the facilities made available by them.

The several organisations included in the scheme were decided by Government to be set up in stages, preference being given to Headquarters establishment, the Eastern and Western Circles, and the Central Botanical Laboratory in the first year itself. It was also decided to develop simultaneously the Industrial Section at the Indian Museum and the Herbarium at the Indian Botanic Gardens at Sibpur, as the Botanical Museum and the Central National Herbarium respectively.

The expansion of the Survey under the scheme was intended to be under a phased programme, consistent with the Five Year Plans launched in respect of various projects in the country.

Implementation of the Plan

In the early stages, there were initial difficulties and consequently the progress of development and expenditure were not rapid. It was not till 13th April, 1954, when the Central Botanical Laboratory under the scheme was established that there were definite indications of the developmental activities on the implementation of the reorganisation and expansion programmes. With the first effort in the setting up of the Laboratory, the hopes of the Survey reached a significant stage of fulfilment. The Central Botanical Laboratory was initially situated on the same premises as that of the office of the Officer-on-Special Duty, in the Museum House, and Dr. E. K. Janaki Ammal was appointed as the Director of that Laboratory on the 13th April, 1954. The Laboratory itself then consisted of but one hall which had to be used both for scientific and office purposes and the Industrial Section in proximity to the Laboratory was also available. The accommodation in the Museum House was found too inadequate for the proper functioning of the newly created Laboratory, and it was decided to shift it to Lucknow in a portion of the building under the occupation of the Central Drug Research Institute, under the Council of Scientific and Industrial Research, New Delhi. The Central Botanical Laboratory moved into the premises of the Central Drug Research Institute on 2nd December, 1954, from where it ultimately moved into its permanent location at Allahabad early in December, 1957.

The post of the Chief Botanist, as Head of the Department of the Botanical Survey of India which was provided in the scheme, was filled up by the appointment thereto of Rev. Father H. Santapau, S. J., on the 1st December, 1954. The powers previously delegated to the Director, Botanical Survey of India were withdrawn, on the post having been by then abolished, and the Chief Botanist was declared as the Head of the Department by the Ministry of Finance, in their letter of 11th January, 1955. That Officer derived much more enhanced powers. The Office accommodation for the Chief Botanist was also provided in a portion on the first floor of the Indian Museum House, where it remained just for nine months only. With 1st September 1955, the office of the Chief Botanist shifted to the premises known as Hindu Mutual Buildings, at 14, Madan Street, Calcutta where it occupied the second floor of the building. Rev. Father Santapau did not continue long as Chief Botanist, and he relinquished charge of office of the Chief Botanist on the forenoon of 1st October, 1955, on which date Dr. J. C. Sen Gupta, erstwhile Principal, Presidency College, Calcutta, assumed charge as Chief Botanist.

With the appointment of Chief Botanist as the controlling and co-ordinating authority of the Survey, rapid expansion of the department held a central place in the reorganisation plan. The further development of the Survey was not perhaps without encouragement, as subsequent events would substantiate.

Setting up of Four Regional Circles

Efforts were made to establish the four regional circles as provided under the scheme as expeditiously as possible. The Southern Circle was the first to be set up on the 10th October, 1955 at Coimbatore. This was followed almost immediately by the setting up of the Eastern and Western Circles on the 10th and 17th December, 1955 respectively at Shillong and Poona. The Northern Circle started functioning on its establishment at Calcutta on the 21st March, 1956, and by 1st August, 1956, it shifted to its Headquarters at Dehra Dun. The appointment of Regional Botanists to various Circles were effected on the 1st February, 1956 (East), 14th February, 1956 (West), 21st March, 1956 (North) and 30th March, 1956 (South). The office accommodation for the Circles were provided in their respective localities in private buildings hired for the purpose.

The jurisdiction of each Circle was broadly defined originally as comprising of the States of Jammu and Kashmir, Punjab, Himachal Pradesh, Uttar Pradesh and Delhi for the Northern ; Orissa, Bihar, West Bengal, Assam, Bhutan, Sikkim, N.E.F.A., Tripura and Manipur for the Eastern ; Madras, Andhra Pradesh, Hyderabad, major parts of Madhya Pradesh and the old Vindhya Pradesh, Andaman and Nicobar Islands for the Southern ; and States of Rajasthan, Cutch, Saurashtra, Bombay, Mysore, Kerala, parts of Madhya Pradesh and Madras not falling within the Southern Circle and Laccadive and Minicoy Islands for the Western Circle.

Principal Local Herbaria transferred to Botanical Survey

The Survey of the particular regions was the responsibility of the Regional Circles for which the scheme provided the utilisation of the local facilities afforded by the States. As Herbaria are indispensable instruments for all work connected with the survey of the Flora of the country, the question of transference to the Botanical Survey, of the most important Herbaria which were in possession of various institutions under different State Governments, was taken up at Government levels, and amicable settlements having been reached by the Union and State Governments concerned, the Herbaria hitherto with some of the State Government organisations were transferred to the Botanical Survey. Thus the Herbarium of the Forest Department of Assam Government with some staff, was taken over by the Survey on the 9th August, 1956, to form an integral part of the Eastern Circle. The transfer of the Herbarium of the Economic Botanist to the Government of Bombay which erstwhile was housed in the Agricultural College, Poona, to the Western Circle at Poona was effected during the period from 18th September, 1956 to 29th March, 1957. The great Herbarium at the Sibpur Botanic Gardens, hitherto with the West Bengal Government was transferred to Botanical Survey on 1st April, 1957, to constitute the National Herbarium of the Survey. The Madras Herbarium was taken over by the Survey from the Agricultural College and Research Institute, Government of Madras, on the 31st December, 1957, to be amalgamated with the Southern Circle, although, for the time being its location was left undisturbed. There was no transfer of any herbarium in respect of the Northern Circle, which, however, had the necessary facilities for its herbarium work provided at the Herbarium of the Forest Research Institute, Dehra Dun. The transference of the Herbaria to the Circles provided the opportunity to establish Regional Herbaria, under the various circles.

When all the units of the Botanical Survey of India started functioning a Conference of the heads of all sections was convened by the Chief Botanist in Calcutta in April, 1957 to discuss the various problems and difficulties facing the Botanical Survey of India and important and useful conclusions were reached.

Accommodation for the Different Centres

The expansion of the Survey called for the need for alloting suitable lands for experimental cultivations, gardening, proper housing of the Herbaria, research centres and offices. It was originally proposed that at least 10 acres of land for the purposes envisaged, should be made available to each of the units of the Survey. This proposal did not materialise in its entirety, because of various difficulties coming in the way. The need was, however, in some cases met by transfer of small acreage of lands also by the State Governments to the Botanical Survey, along with the transfer of the Herbaria in accordance with the terms of agreements entered into by the various Governments. Thus the Madras Government placed at the disposal of the Botanical Survey two acres of land for the Regional Herbarium at Coimbatore. Three acres of land were agreed upon for transfer to the Survey by the West Bengal Government, with the transfer of the Sibpur Herbarium, the land being from within the Gardens and in close proximity to the existing Herbarium Building in the Botanical Gardens at Sibpur. But all the four circles are still actually working in rented houses. For the Central Botanical Laboratory, an area of about seven acres of land was acquired at Allahabad with the old building of the former Commissioner's Office.

Building Programmes and other Major Civil Works

Selection of suitable buildings with adequate space to meet the growing requirements of the various units of the Botanical Survey assumed greater and greater importance. In some cases, alterations, additions and expansions to the existing buildings were found necessary. In other cases, fresh buildings had to be designed for construction. The space requirements in respect of godowns and collection branches, had also to be met.

Among the new buildings projected for construction, one building for the Central National Herbarium at Sibpur, another for the Southern Circle at Coimbatore to be erected on the two acres of land given by the State Government, and a third for the Central Botanical Laboratory at Allahabad, would require special mention. An additional storey to the existing Industrial Section Building at the Indian Museum was also an item under active consideration. To provide adequate accommodation for the Botanical Survey of India at Calcutta, with its increasing activities, proposals have also been made to build an entirely new building with all modern equipments for a scientific organisation as that of Botanical Survey of India in lieu of the interim arrangements that had to be made by renting out small accommodations, in private buildings, which are most unsuitable for the development and proper functioning of the Survey. Attempts are also being made to provide the Eastern, Western and Northern circles with buildings and land of their own.

Data on Un-explored and Under-explored Regions

With the organisation of the regional circles and the appointment of Regional Botanists with the requisite staff thereto, field survey gained considerable momentum. The Survey in respect of each region was designed to be on definite planned basis. The country is very wide, and the flora it supports is of very varied types. Although a fair and comprehensive idea of the flora of the whole of India is available from the records of earlier explorers, it became clear that, that information had to be amended and augmented, especially as several regions had neither been visited by Botanists before, nor had some of the visited regions been thoroughly explored. Accurate data on un-explored and under-explored regions in India, had, therefore, to be collected and mapped, to serve as a guide to the future exploring Botanists. The circles started work on this programme and much valuable and original results have been obtained within a very short period. The un-explored and under-explored regions having thus been delineated, definite policies were laid down for exploring those regions, side by side with other areas so that ultimately data may be available on the composite flora of the entire country with a high degree of precision and accuracy.

Frequent visits on a planned basis to various localities within each region, by the Botanical Survey parties became a regular feature. But uniformity in such operations could not be rigidly enforced and the circles were given a certain amount of latitude to chalk out their own mode of expeditions, determined by local factors and other conveniences. Thus while certain circles chose for a year only a limited number of stations of all categories, and explored them thoroughly, throughout the seasons of the year, some other circles chose a larger number of areas widely distributed, for an year, the explorations of which, though would preclude the possibility of frequency of visits in respect of many areas within that particular year, could ultimately in the long run yield the desired results. The specimens collected by the circles during their various botanical expeditions have swelled up sufficiently to contribute towards the development of Regional Herbaria in each circle. The data and other particulars collected by each circle will in due course form the basis for several local floras. Standard procedures have been laid down for the development and maintenance of the various Regional and Central National Herbaria, whereby the Regional Circles, after retaining the minimum required herbarium collections of each specimen gathered by them, will send the rest to the headquarters of the Botanical Survey of India which is the ultimate place for exchange of specimens for the Survey.

Liaison with Kew

The inter-relationship that existed in the earlier years between the Botanical Survey and the Kew Gardens with its famous Herbarium, has been referred to already. While no doubt the National Herbarium of the Botanical Survey is famous in its own way, owing to the historical incidents in the past, it has to take recourse to Kew in certain matters, particularly with regard to Type-sheets of Indian origin, many of which are now in that great institution. In the present stage of development of Botany, in the country, and the quality of material available, it would be necessary to invoke the assistance and co-operation of the premier institution at Kew, for authenticating and creating co-type sheets for future references. This work is likely to be appreciable and the Kew authorities are not likely to undertake the work without necessary assistance. A Liaison Officer is, therefore, necessary at Kew. In the past, there was a post of an Assistant for India at the Royal Botanic Gardens at Kew, and from time to time appointments had been made to it, the necessary provisions being made in the Botanical Survey budget under "Charges in England". The last appointment so made was in the year 1945, for about two and half years from that date, after which it had ceased. Efforts are being made for creating a post of sufficient standing in the reorganised Survey. The benefit that Indian Botany would derive by this arrangement is considerable, as that would help enormously in the preparation of monographs and revisions of Floras of the country now projected by the Survey.

Receipt of some of Wallichean Collections

Immediately after the reorganisation of the Botanical Survey of India, about January, 1955, the Chief Botanist made certain recommendations to Government for obtaining representative collections from the great Wallichean Herbarium, which will have a bearing on the Indian Flora. The set of collections with Kew were left to be kept undisturbed in the interest of Science. There was, however, an offer from the Swiss Government for a set of Wallichean collections, and the Government of India were pleased to accept the same, and incur expenditure on this set being obtained for the Botanical Survey of India. As a result of these negotiations, two consignments of Wallichean collections were received by the Survey so far.

Reprinting of Old Standard Floras

Revision and compilation of Floras became the key-note of the Circles, in the re-organised Survey. With a large majority of the people, information on the flora of a particular locality, and correct identity of the species, assumed sufficient importance, as they had an impact on the various branches of botanical studies and commercial enterprises in the country. Work on Taxonomy and teaching of Systematic Botany in the University curriculum were adversely affected as the students could not get copies of the local floras for their use in practical classes, as standard books have become rare and out of print. The indispensability of standard books of references was keenly felt by Botanists and others for a long time, and as a remedial measure, at a Conference of some eminent Botanists held at Delhi on 30th March, 1955, the resolution to reprint the rare and out of print Regional Floras was adopted. The work was thereupon relegated to the Botanical Survey. A small contingent of staff necessary for the purpose was soon created in the Survey, at the office of the Chief Botanist at Calcutta.

The Floras which were required to be reprinted were, the Flora of Madras Presidency by J. S. Gamble and C. E. C. Fischer ; the Flora of Bombay Presidency by T. Cooke ; the Flora of the Upper Gangetic Plains by J. F. Duthie ; the Botany of Bihar and Orissa by Haines ; and the Bengal Plants by D. Prain.

When the work was taken up, the Survey had to face a new difficulty in procuring copies of the different Floras for the Press. After some exploratory work, the Survey succeeded at last in procuring the old and rare sets for the Press, from sources within and outside the Survey.

In the reprinting of the Floras, it was considered desirable to have all the Floras of one standard size. The size chosen was that of $\frac{1}{16}$th double demy. The printing of the Floras according to the specifications laid down by the Government of India Press authorities, was entrusted to a private Press in Calcutta. The reprinted editions of these Floras will thus remove a long-felt need, and there is reason to believe that the release of these floras would accelerate studies on Systematic Botany in the country. Since then the reprinted floras of Bombay and Madras have been released for sale at a moderate price.

Setting Up of Libraries at Various Centres

Before re-organisation, the Botanical Survey had its libraries at the Industrial Section and at the Systematic Division at Sibpur Herbarium. But with the expansion of the Survey, and the setting up of various units under the Survey, libraries in respect of each were also organised. Some of the new organisations had the benefit of transfer of books and publications from the same source from which the State Herbaria were transferred to the Survey, as in the case of the Western Circle, Southern Circle, Eastern Circle and to a limited extent the National Herbarium. The library needs of all the sections now under the Survey are met by developing the different libraries, situated at respective Headquarters of the various units of the Survey at Calcutta, Sibpur, Allahabad, Poona, Dehra Dun, Coimbatore, and Shillong. Catalogues are printed for the collections in all these libraries and so far two issues have been released, one in June 1957 and the other in April 1958. These series will be continued and published as and when sufficient materials accumulate.

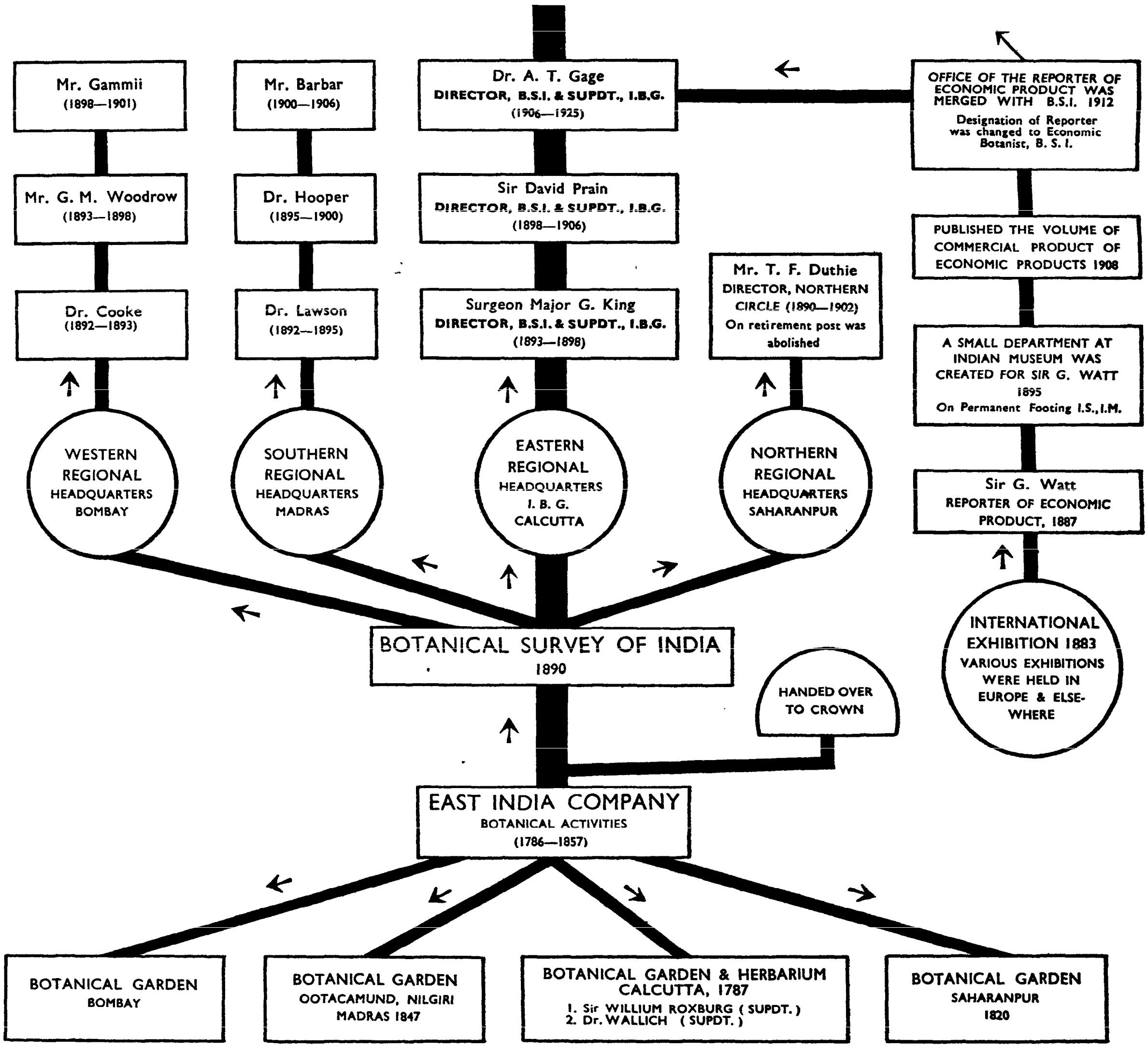
The Present Set Up of the Survey

In the present set up, administration of the Survey vests with the Chief Botanist as the Head of the Department of the Botanical Survey of India. For scientific and executive functions of the Survey, a Central Botanical Laboratory under a Director of the Laboratory, a Botanical Museum under a Curator, a Central National Herbarium under a Keeper and four Regional Circles each under a Regional Botanist have been established. Although each unit of the Survey is at present provided with such technical, scientific, clerical and last-grade staff, as are considered necessary, and to the extent permissible under the available funds and other facilities, the needs of Headquarters establishment of the Survey, have not been adequately met in respect of the scientific personnel of various categories, so essential for affording facilities for scientific work, proper direction and guidance in the different branches of Botanical investigations to be undertaken by the Department. The general set up of the Survey, as now, is indicated in the chart illustrated.

OTHER ACTIVITIES

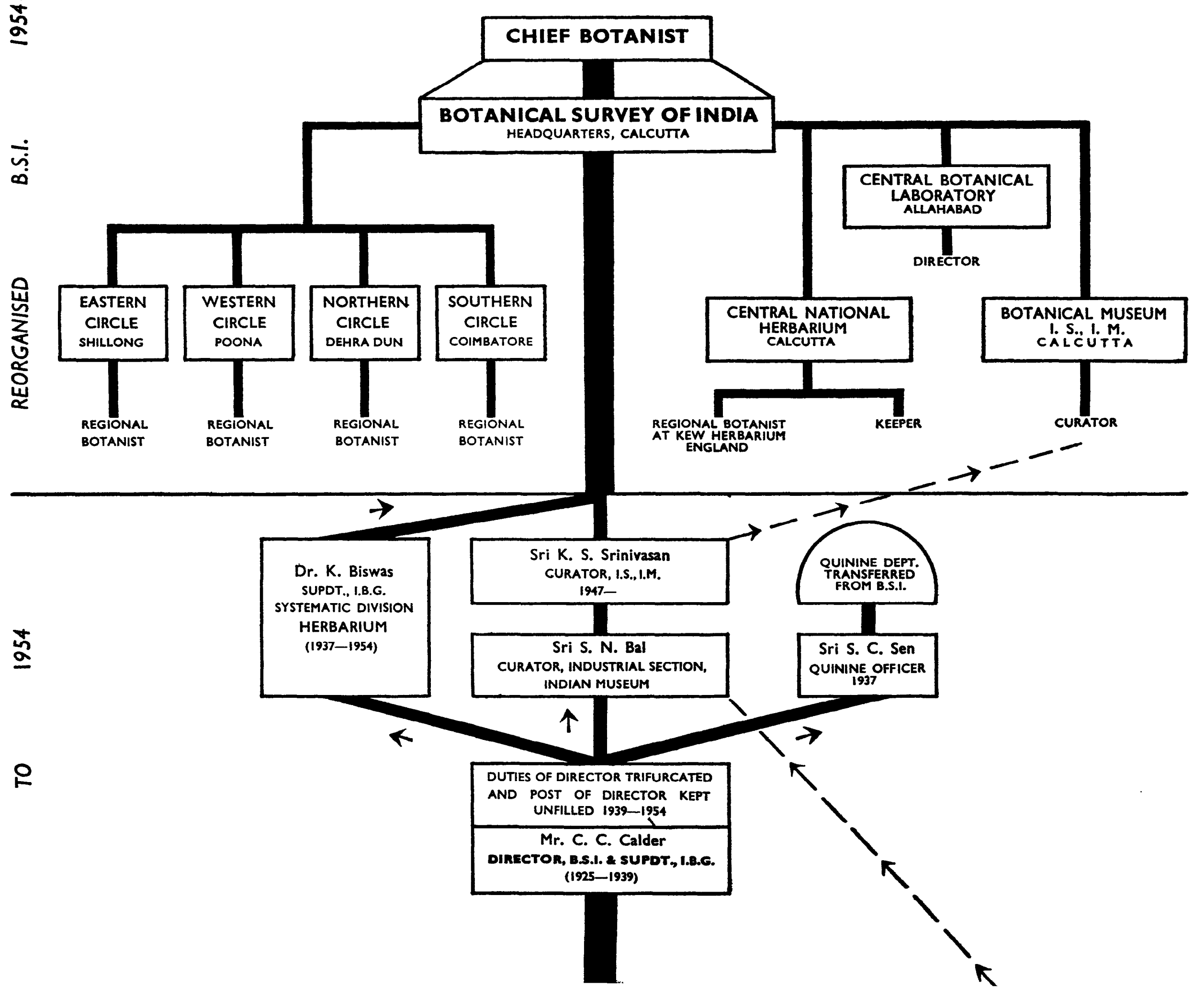
Apart from the normal activities of the Botanical Survey, the department is also looked upon by various research organisations as a possible collaborator in carrying out their research programmes. The following are some of the important fields in which the Survey's co-operation has been enlisted.

PAST HISTORY FROM 1786


Mr. Gammii (1898—1901)
Mr. Barbar (1900—1906)
Dr. A. T. Gage DIRECTOR, B.S.I. & SUPDT., I.B.G. (1906—1925)
OFFICE OF THE REPORTER OF ECONOMIC PRODUCT WAS MERGED WITH B.S.I. 1912
Designation of Reporter was changed to Economic Botanist, B. S. I.
Mr. G. M. Woodrow (1893—1898)
Dr. Hooper (1895—1900)
Sir David Prain DIRECTOR, B.S.I. & SUPDT., I.B.G. (1898—1906)
PUBLISHED THE VOLUME OF COMMERCIAL PRODUCT OF ECONOMIC PRODUCTS 1908
Dr. Cooke (1892—1893)
Dr. Lawson (1892—1895)
Surgeon Major G. King DIRECTOR, B.S.I. & SUPDT., I.B.G. (1893—1898)
Mr. T. F. Duthie DIRECTOR, NORTHERN CIRCLE (1890—1902) On retirement post was abolished
A SMALL DEPARTMENT AT INDIAN MUSEUM WAS CREATED FOR SIR G. WATT 1895
On Permanent Footing I.S., I.M.
WESTERN REGIONAL HEADQUARTERS BOMBAY
SOUTHERN REGIONAL HEADQUARTERS MADRAS
EASTERN REGIONAL HEADQUARTERS I. B. G. CALCUTTA
NORTHERN REGIONAL HEADQUARTERS SAHARANPUR
Sir G. Watt REPORTER OF ECONOMIC PRODUCT, 1887
INTERNATIONAL EXHIBITION 1883
VARIOUS EXHIBITIONS WERE HELD IN EUROPE & ELSE-WHERE
BOTANICAL SURVEY OF INDIA 1890
HANDED OVER TO CROWN
EAST INDIA COMPANY BOTANICAL ACTIVITIES (1786—1857)
BOTANICAL GARDEN BOMBAY
BOTANICAL GARDEN OOTACAMUND, NILGIRI MADRAS 1847
BOTANICAL GARDEN & HERBARIUM CALCUTTA, 1787
1. Sir WILLIUM ROXBURG (SUPDT.)
2. Dr. WALLICH (SUPDT.)
BOTANICAL GARDEN SAHARANPUR 1820

ORGANISATIONAL CHART

BOTANICAL SURVEY OF INDIA


REORGANISED B.S.I. 1954—
TO 1954
CHIEF BOTANIST
BOTANICAL SURVEY OF INDIA
HEADQUARTERS, CALCUTTA
EASTERN CIRCLE SHILLONG
WESTERN CIRCLE POONA
NORTHERN CIRCLE DEHRA DUN
SOUTHERN CIRCLE COIMBATORE
REGIONAL BOTANIST
REGIONAL BOTANIST
REGIONAL BOTANIST
REGIONAL BOTANIST
CENTRAL BOTANICAL LABORATORY ALLAHABAD
DIRECTOR
CENTRAL NATIONAL HERBARIUM CALCUTTA
REGIONAL BOTANIST AT KEW HERBARIUM ENGLAND
KEEPER
BOTANICAL MUSEUM I. S., I. M. CALCUTTA
CURATOR
Dr. K. Biswas
SUPDT., I.B.G.
SYSTEMATIC DIVISION
HERBARIUM
(1937—1954)
Sri K. S. Srinivasan
CURATOR, I.S., I.M.
1947—
Sri S. N. Bal
CURATOR, INDUSTRIAL SECTION, INDIAN MUSEUM
QUININE DEPT. TRANSFERRED FROM B.S.I.
Sri S. C. Sen
QUININE OFFICER
1937
DUTIES OF DIRECTOR TRIFURCATED AND POST OF DIRECTOR KEPT UNFILLED 1939—1954
Mr. C. C. Calder
DIRECTOR, B.S.I. & SUPDT., I.B.G.
(1925—1939)

Central Indian Medicinal Plants Organisation (CIMPO)

During the Second Five Year Plan period, the medicinal plant resources of our country assumed greater importance, and for a fuller and better appreciation of our vegetable wealth for commercial exploitation, a powerful organisation was established by the Council of Scientific and Industrial Research in which the Botanical Survey of India was also recognised as a centre for co-ordinated researches on medicinal plants.

Schemes Sponsored by the UNESCO

The Botanical Survey participated in the general symposium on Humid Tropics organised under the UNESCO programmes, and the Survey availed itself of the opportunity afforded in the training in Ecological work. The officers from the Regional Circles had their training at Jaipur in 1958, where the course was conducted.

Monographs and Research schemes

Monographs on the Genera of flowering plants of India, and Chromosome Atlas of Indian flowering plants are being worked at the Survey under the auspices of C.S.I.R. Besides work on a number of research schemes financed by various bodies are now in progress in the different centres of the Botanical Survey of India.

Tea Research under the Tea Board

For the furtherance of the expansion of tea trade and to improve the plantations, the Tea Board is interested in promoting research on Tea with special stress on fundamental research. For a proper examination of the question, the Tea Board has formed a Tea Research Liaison Committee to advise them and the Chief Botanist is a member of the Committee. He participated in the deliberations which resulted in the proposal for the formation of a Central Tea Research Institute.

Tea Board has accepted a proposal for establishing Taxonomic collection of the varieties of Tea, allied species and genera, to be worked out under the Chief Botanist, Botanical Survey of India, to be ultimately transferred to Tea Research Institute when it is established.

CONSOLIDATION PLANS

The reorganised Botanical Survey of India started its work to implement the programme four years now, has first of all to consolidate its activities and take up items of work on which much progress could not be made due to various difficulties. The chief difficulty of finding suitable accommodation has already been mentioned.

Indian Council of Ecological Research (ICER)

The Indian Council of Ecological Research was established in 1955 under the Government of India, Food and Agriculture Ministry in 1957. There had been discussions at Government level among the various Ministries under the Central Government and it was ultimately decided that the scheme is to be run by the Botanical Survey. In this, proposals have been made to set up different sections to deal with soil science, climatology, microbiology etc. In the initial stage, the scheme will start functioning from the Headquarters organisation of the Botanical Survey of India at Calcutta and will include studies on climate diagrams and vegetation mapping.

Setting up of National Orchidarium

In the Second Five Year Plan, proposals were made for the organisation of a National Orchidarium at Shillong under the Botanical Survey of India as a specialised institution for the proper appreciation of the Orchid wealth of our country and for their economic and other potentialities. A small beginning has already been made in this direction. The orchids collected by the Eastern Circle, under whose territory orchid is, undoubtedly richest, will form the nucleus of this Orchidarium.

Setting up of Cryptogamic & Other collections & Laboratories

For the present the Central National Herbarium will specialise in Phanerogams generally. In the near fuutre, a herbarium for Cryptogams will be developed at the Botanical Survey at Calcutta, and Laboratories will also be simultaneously developed at Calcutta for work on Ecology, Plant Chemistry, Pharmacognosy, Cyto-Taxonomy and Anatomy in relation to Systematics. Provisions will also be made in due course for studies on fossils, pollen, wood etc. There will also be a separate section for carpological collections.

Studies on Economic and Medicinal Plants

Although the primary object of the Botanical Survey of India is a correct appraisal of the indigenous flora of the country and with special reference to the economic utilisation of plant wealth, in the present set up, a considerable amount of experimental work is also provided in the programme of work, in respect of the subjects mentioned above, even in the Regional Circles in course of time. A considerable amount of work has already been done on the medicinal plants of India by the Survey. This line of investigation will be further consolidated and expanded.

A New Circle for Madhya Pradesh & An Arid Zone Research Centre in Rajasthan

In addition to the existing four Regional circles at Dehra Dun, Shillong, Coimbatore and Poona, two more centres have been contemplated, to release pressure on some of the existing circles. The two new centres have been proposed to be set up, one circle at Jabbulpur for Madhya Pradesh and the other an Arid Zone Research Centre at Jaipur. The Arid Zone Research Centre in Rajasthan will not only make a floristic survey of the arid zone areas but will also undertake investigations in the Physiology, with special relation to drought resistance, and water relation, and Cytogenetics of the arid zone plants which will be useful for the proposed Arid Zone Research Institute to be established in collaboration with UNESCO in their project of halting deserts. The Circle for Madhya Pradesh has also been necessitated by the fact that, that region contains perhaps large areas quite un-explored hitherto, and the problems related to Ecology and the like are likely to be quite interesting and revealing.

Special studies on Marine Plants

As recommended by the Conference of Botanists in 1955 a special section for the study of Marine flora will be a very important project considering the variety and volume of plant resources in the wide areas of the sea-faced peninsula.

Special studies on Fresh Water Plants

This Section will carry on a survey and investigations on fresh water plants including algae. Studies on Chlorella which is being widely investigated as a source of food due to its high protein content and other algae having suitable characteristics will be its special feature.

Experimental Gardens in different climatic regions

For experiments on the possibilities of growing plants specially those of economic importance in different climatic regions of the country and on the introduction of exotic plants, establishment of experimental gardens in different climatic zones of the country is contemplated. These gardens will be utilised for studies on germination and growth habits of plants of economic importance and also for pure scientific studies.

Conclusion

It may be stated that the Botanical researches in the country would have been very different to-day if the Botanical Survey of India had functioned and expanded its activities in proper magnitude and perspective during the six decades of its existence after establishment. However, the expansion of the Survey with increased activities is an unmistakable sign of growing conscience of the Botanical Science in the country. The increasing tempo of activities in wider spheres marks the stability of the Survey, and the progress will be watched for its exciting possibilities. More than three centuries and a half had passed since the formation of the East India Company, which exercised a pronounced influence in the shaping of Indian Botany. In recent years, with considerable specialisation and advancement in science, there may be an apparent shifting of values in regard to Systematic Botany. But in retrospect, and even at this distance of time, the stature of William Roxburgh and Nathaniel Wallich is not diminished, in the context of the present day specialisation in Botanical sciences. And Wallich is perhaps the greatest single influence, through whose example of indefatigable and inimitable energy, Indian Botanists in the country would derive unlimited inspiration in Botanical field explorations.